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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,783	03/04/2004	Shin Yamaguchi	249967US0X	4397
22850	7590	08/09/2006	EXAMINER	
C. IRVIN MCCLELLAND OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			ROBERTS, LEZAH	
			ART UNIT	PAPER NUMBER
			1614	

DATE MAILED: 08/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/791,783	Applicant(s) YAMAGUCHI ET AL.	
	Examiner Lezah W. Roberts	Art Unit 1614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims

All previous rejections are withdrawn unless stated below. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

This action is made **NON-FINAL**.

Claim 5 is objected to because of the following informalities: The claim recites the phrase "titanium oxinitride powder" twice. It is believed one of the phrases should read "nitrogen doped titanium oxide powder". Appropriate correction is required.

Claim Rejections - 35 USC § 103 – Obviousness (Previous Rejection)

1) Claims 1-4 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Montgomery et al. (US 2003/0198605) in view of Morikawa et al. (US 2002/0006865). The rejection is maintained.

Applicant argues Montgomery et al. does not use nitrogen doped titanium oxide powder or titanium oxinitride powder in the teeth whitening compositions disclosed therein. This argument is not persuasive. Montgomery does teach titanium oxides as photocatalyst. Applicant argues Morikawa et al. does not suggest using nitrogen doped titanium oxide powder or titanium oxinitride powder in a dental composition and merely recites "a photocatalytic substance which can exert a stable photocatalytic function

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when irradiated by light in a visible range." This argument is not persuasive. Morikawa et al. suggests the photocatalyst nitrogen doped titanium oxide can be used in place of titanium oxide. They also show the photocatalyst have enhanced activity. Therefore it would be obvious to use these photocatalyst in order to enhance the whitening affects of the compositions on the teeth.

Claim Rejections - 35 USC § 103 – Obviousness (New Rejection)

1) Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nathoo (US 2003/0103913). in view of Morikawa et al. (US 2002/0006865).

Nathoo teaches dual component whitening compositions comprising a transition metal oxide and hydrogen peroxide. The first and second components remain separate from each other until dispensed for application to teeth. The first component may comprise Pluronic F127 (a thickening agent), water (a carrier) and hydrogen peroxide. The second component comprises titanium dioxide, sodium lauryl sulfate and Tween 20 (which are organic compounds, Tween 20 being a liquid) (see Example 1). The amount of titanium dioxide incorporated in the second component ranges from 0.1 to 6% by weight and preferably between 0.25 to 4% by weight (page 2, paragraph 0025). The amount of hydrogen peroxide used ranges from 0.1 to 30% by weight. The thickener makes up 15% to 50% of the composition (paragraph 0032). The pH of the titanium dioxide comprising component is about 10. The compositions also comprise sodium fluoride which is a metal salt encompassing claim 6. The reference differs from the

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instant claims insofar as it does not teach using nitrogen doped titanium oxide or titanium oxinitride in the second component of the compositions.

Morikawa et al. teaches titanium oxide photocatalyst. The photocatalyst include titanium nitride with the formula Ti-O-N. The Ti-O-N photocatalyst can exert a stable photocatalytic function when irradiated by light in a visible range, and which can be produced easily and at a low cost (paragraph 0008). The photocatalytic substance according to the present invention comprises a photocatalyst material, which operates under visible light, or is activated by visible light, supported on a porous medium. Supporting the photocatalyst material on the porous medium enhances the efficiency of the operation of the photocatalyst material under visible light (paragraph 0009). The photocatalytic substance may include one or more of V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ru, Rh, Pd, Re, Os, Ir, Pt, Mo and Nb, substituting at one or more titanium sites in Ti--O--X, doping between Ti--O--X crystal lattices, doping to crystalline grain boundary of Ti--O--X, or a combination of these methods. A simultaneous doping of both cationic and anionic species enhances the catalytic activity of the photocatalyst (paragraph 0011). By including such anionic species into an oxide, or by further doping cationic species, a new level is formed in a band gap of the oxide which becomes standard, resulting in a photocatalyst which absorbs visible light (paragraph 0012). The porous medium is preferably formed from ceramics such as alumina, silica, zirconia and titanium oxide; diatomaceous earth, zeolite, sepiolite and activated carbon, or from a composite or mixture of them. Such substances do not readily decompose when in contact with a photocatalytic material, and are therefore preferable for forming a porous medium for

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supporting the photocatalyst thereon (paragraph 0013). Preferably, the porous medium comprises mesopores. It is further suitable that the porous medium has a honeycomb structure. Such porous medium can maintain a high catalytic activity of the photocatalyst material (paragraph 0014). The honeycomb pattern is similar to a mesh pattern therefore encompassing what is recited in claims 4 and 5. It is suitable that one or both of nitrogen (N) and sulfur (S) as anions are doped in atomicity of over 0 and not more than 13% to titanium oxide (TiO₂). The electronic state of a TiO₂ semiconductor is changed by doping N or Ti--O--N, and a new absorption band is formed in a band gap of titanium oxide. As a result, it becomes possible to absorb not only ultraviolet light, but also visible light so that a photocatalytic reaction is observed in response to exposure to visible light (paragraph 0031). The presence of nitrogen makes titanium oxide a better photocatalyst. Titanium oxide may have a crystalline structure of anatase and rutile or an amorphous structure, and nitrogen may be doped. When nitrogen is doped, the doped nitrogen and a titanium atom are chemically bonded. Photocatalytic activity in visible light is high when such a chemical bond exists. When the photocatalyst is supported on a silica substrate such as FSM, remarkably enhanced the photocatalytic function. This is because FSM has very small projections and depression on its surface (paragraph 0048). The same effects were also observed when materials such as Ti--O--N--Fe, Ti--O--N--V, Ti--O--N--Cu and Ti--O--N--Co were used as the photocatalyst material (0049). The catalytic function of photocatalytic material also tends to promote decomposition of organic substances. The reference

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differs from the instant claims insofar as it does not disclose using the photocatalyst of the present invention in compositions for whitening teeth.

It would have been obvious to one of ordinary skill in the art to have used the nitrogen doped titanium oxides and additional metal oxides in the whitening compositions of the primary reference motivated by the desire to enhance photocatalytic activity and to activate the photocatalyst with visible light at higher wavelengths as disclosed by the secondary reference.

Obvious-Type Double Patenting

Claims 1-4 and 12-13 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-13 of copending Application No. 10/644808 in view of Montgomery (US 2003/0198605). The rejection is maintained.

Claims 1-13 are rejected.

No claims allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lezah W. Roberts whose telephone number is 571-272-1071. The examiner can normally be reached on 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ardin H. Marschel can be reached on 571-272-0718. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lezah Roberts
Patent Examiner
Art Unit 1614



Frederick Krass
Primary Examiner
Art Unit 1614

